

Comments in response to the Examiner's action

1. Comment in respect to Point 4 of OA, Claim 24 (no functional relationship)

1A. Claim 24 has been amended and reformulated so as to incorporate a functional relationship between the displayed target image and the computing system synthesizing said displayed target image, where the software running on this computing system renders the target image with the limitations present in the rendering step of claim 1.

There is now a clear functional relationship between the displayed target image and the computing system rendering that target image. This amended claim should be now allowed.

1B. In amended Claim 36, the reference to the non-functional limitation of: " where from far away mainly a global image representing said rendered original color image is visible and from nearby mainly the evolving embedded microstructure is visible" has been removed.

Therefore, amended claim 36 should now be allowed.

2. Comments in respect to Point 6 of OA

Claim 13 has been amended as proposed by Examiner.
It should now be allowed.

Claims 37 and 38 have been amended in order to have sufficient antecedent basis.
They should now be allowed.

3. Comments to Gray III (US 5,856,829)

The invention described in US Pat 5,856,829 to Gray III aims at rendering a model "from a 3D space into a frame buffer" (claim 1) by a method and an apparatus (computer hardware). This invention relates to the rendering of 3D graphics on a computer display and has not the goal of rendering a 2D image by an independent animated microstructure forwarding a message of its own, said microstructure being generated according to a halftoning method. Therefore the two inventions are clearly distinct.

The detailed comments below show that the Examiner's arguments do not hold, mainly because the invention by Gray III is not pertinent to the present invention. See MPEP 2141.01 (a) "In order to rely on a reference as basis of rejection on an applicant's invention, the reference must either be in the field of applicants endeavor or if not, be reasonably pertinent to the particular problem with which the invention is concerned".

Applicant also respectfully asks Examiner to avoid extracting words from their context and to use them in order to reject the claims of the invention. The context generally shows a different meaning than the one suggested by Examiner to reject our claims. To illustrate this, I have added each time the corresponding context.

In order to have a clear reference to my arguments, I label them as in italic letters (e.g. *Arg 1.1* refers to claim 1, my argument 1).

Claim 1 (Pages 12 and 13 of OA)

1 a): referring to "2-dimensional image"

Arg1.1: With "2-dimensional image" Gray simply describes the image that a user sees as a projection of the 3D model onto 2D space: there is no 2D image that is rendered as in step (c) of our claim.

Context: Col. 22, lines 10-23:

"Referring to FIG. 2A, a perspective view is shown of a three-dimensional coordinate system 200 having an x-axis extending horizontally, a y-axis extending vertically and a z-axis extending generally into the plane of the figure. The three-dimensional space defined by these three coordinates is referred to herein as "model space". In the present embodiment, all displayable objects of the model to be rendered are placed behind the $z=0$ plane. The system user 190 is understood to be situated at the origin facing toward positive z half-space, and seeing a 2-dimensional image projected onto a plane defined as $z=d$ ($d>0$). The $z=d$ plane is referred to herein as the "projection plane" or the "image plane", and its x and y axes are said to define a two-dimensional image space."

1 b)

Arg1.2: Fig. 3 no. 410 label: "Transform (rotate, scale, distort)": there is no reference to an animated transformation.

Arg1.3: The term "time-critical tasks " is extracted from "A triangle-engine in accordance with the invention reduces the load on system memory and on system CPU's by periodically fetching compact render-control lists and source image data from the memory subsystem on a list basis and by processing the fetched information without requiring continuous real-time intervention by system CPU's. This frees the system CPU (or CPU's) for managing other time-critical tasks of the graphics system." (col. 6, lines 11-19).

It refers to real-time constraints for performing the conversion from 3D space into the frame buffer and has nothing in common with a time-dependent geometric transformation.

The time-slots in Figure 5 just indicate the time slots for the transfer of information between CPU and the Triangle Engine (noted TE), since "FIG. 5 is a timing diagram showing pipelined generation of deferred instructions and later execution of same by the triangle engine;" (col. 14, lines 24-26).

Arg1.4: In respect to FIG.2D, "FIG. 2D is a perspective view for explaining the mapped blend-in of texture plane information onto the object surface", (col. 14, lines 15-17) it is mapping between 3D space and 2D space and has nothing in common with a mapping between the 2D target image and the original microstructure space.

1c)

Arg1.5: The words "displayed frame" and "animated images" in Gray III are in the context of a hardware device for rendering 3D scenes on a 2D display. They have nothing in common with "rendering a 2D image by a succession of target image instances".

Context: Col. 15 line 1-6:

"A key feature of system 100 is that it is relatively low in cost and yet it provides mechanisms for handling complex, 3-dimensional (3D) image scenes in real time and displaying them such that they appear to have relatively high resolution and a wide variety of colors and/or shades per **displayed frame**."

Col. 15, line 56-60

System 100 includes a real-time video display unit (VDU) 180 such as an NTSC standard television monitor or a PAL standard television monitor or a 640-by-480 VGA computer monitor or a higher-resolution monitor. The VDU 180 is used for displaying high-resolution **animated images** 185 to a system user 190.

Arg1.6: 1c1) as explained under 1b) above, time slots have nothing in common with a microstructure evolving over time

1d2)

Arg1.7: The "image dithering circuit present in the image-enhancing and rendering subsystem" of Gray III has nothing in common with our step of "halftoning of said two dimensional image".

Context of image dithering circuit : (col 15, lines 24-36)

"Within the I-EARS (image-enhancing and rendering subsystem) group of elements, 160-170-175, there is provided one or more of: a set of user-programmable Color LookUp Table modules (CLUT's, not shown) for defining on a per scanline basis, a palette of colors available for display; an image dithering circuit (not shown); and an image filtering circuit (not shown). The functions of the **image dithering circuit** (not shown) and image filtering circuit (not shown) can be programmably bypassed on a by-the-pixel basis"

1e)

Arg1.8: The symbol of a star in FIG. 2D, no 270 is not a microstructure, but shows how a star-shaped texture element can be projected onto the surface of the globe (see below). It has therefore nothing in common with our invention.

1f)

Arg1.9: In addition the star is not an element independent of the original image since it represents a texture, here a "cloud to be drawn laying over the ocean at region 270" (col.21, lines 21-24) that is mapped into the 3D world.

Context:

Col. 25, lines 19-31

"Referring to FIG. 2D, it is sometimes desirable to blend in a texturing image with the native coloration of the framework triangles. For example, assume that a set of semi-transparent storm clouds are to be drawn lying over the ocean at region 270 in model space. The rendering of such additional information is referred to as texturing. The textured image may be made to appear as if it wraps 3-dimensionally about the three-dimensional surface of the rendered native object. FIG. 2D shows an example wherein a **regular five-pointed star** 280 is projected onto the surface of globe 210 with rotation and perspective adjustment to thereby produce the 3-dimensionally **wrapped star** 270 near the horizon of globe 210".

1g)

Arg1.10: as mentioned above, the star 280 and 270 is not a microstructure representing an independent visual motif but a star-shaped texture related to the global image (semi-transparent storm cloud).

Due to applicant's arguments above, claim 1 should be allowed.

Claim 3 (page 13 of OA)

Arg3.1: The "opaque pattern col. 23, line 40" has nothing in common with a mask for rendering only part the original image with an animated microstructure.

Context:

col. 23, line 40: "multi-colored opaque pattern 250 representing the land masses of the Western hemisphere".

Claim 3 should therefore be allowed.

Claim 5 (page 14 of OA)

Arg5.1: "Dither matrix" is a register in Gray's hardware device (TABLE XXIV Register Name Access Description, col. 39). It has nothing in common with a dither matrix embedding a microstructure.

Claim 5 should therefore be allowed.

Claim 10 (page 14 of OA)

Arg10.1: The explanation about the "texel" in Gray III does not deal with blending of shapes, but with the mapping of a texel area into an area defined by display pixels.

Context:

Col. 20, lines 58-64. "Due to the assignment of depth-independent texture space coordinates to the vertices of polygons to be rendered, for each polygon there is a correspondence between the area covered by a texel and the area of a display pixel. Depending on the orientation of the polygon in model space relative to the image plane, and other factors, this correspondence can vary significantly from one part of the polygon to another."

Claim 10 should therefore be allowed.

Claim 34 (pages 9-10 of OA)**34a)**

Arg34.1: The claim is amended and the words operable and capable are removed.

34b)

Arg34.2: In respect to the "Time slots" the same arguments **Arg1.2- Arg1.4** as in claim 1 b) apply.

Arg34.2: In respect to the "halftoning operation" the same argument **Arg1.7** as in claim 1 d2) applies.

Claim 34 should therefore be allowed.

Claim 36 (page 11 of OA)**36a)**

Arg36.1: The claim is amended and the word capable is removed from the amended claim

36a1)

Arg36.2: FIGS 1A and 1B show a graphics system, with hardware connections between the graphics system and the triangle engine (TE). This has nothing in common with a "server computing system".

The "wireless broadcast receiver" is just an means of receiving instructions or image data and is not a server computing system interacting with a client computer and display system.

Context:

Col. 13, lines 65-67

"FIG. 1A is a block diagram of a graphics system in accordance with the invention that includes a programmably-configurable triangle-engine (TE);"

Col. 14, lines 1-5

"FIG. 1B is a close-up block diagram showing more details of a triangle-engine (TE) in accordance with the invention and the parts of the graphics system with which the TE interacts;"

Col. 18, lines 1-5.

"Instructions and/or image data are loadable into the memory units 130-131 from a variety of sources (not shown), including but not limited to magnetic or optical floppy or hard disk drives, a CD-ROM drive, a silicon ROM (read-only-memory) device, a cable headend, a wireless broadcast receiver, a telephone modem, etc."

36a11)

Arg36.3: "request", "native data", "texturing data" is mentioned in the context of hardware and has nothing in common with a "server computing system interacting with a client computing and display system".

Arg36.4: Texture data has also nothing in common with our microstructure since the texture is an intrinsic part of the global picture and not as in our invention, independent of the global image. In addition, the texture is not created by a halftoning operation.

Context: col. 16, line 64-67:

"The MAC0 unit 120 may exercise exclusive control over the address (A0) and control (C0) buses of the first memory unit 130. Any other device which wishes to gain access to the A0 and C0 buses then has to send a corresponding request to the MAC0 unit 120 over address/control bus 124. The MAC0 unit 120 arbitrates among contending requesters and grants access to the highest priority requester. "

Col. 18, lines 15-26

Buses 122, 123 and 124 depict in a general sense the respective data and control paths for moving instructions and image data into and out of memory units 130-131. Downloaded image data (including native and texturing data) can be in compressed or decompressed format. Compressed image data may be temporarily stored in a compressed image buffer of memory 130-131 and expanded into decompressed format either in system memory or inside the triangle-engine on an as needed basis. Immediately-displayable image data, such as that of a below-described frame buffer (FBO 140) may be maintained as a linked list of non-compressed data.

36a12)

Arg36.6: see argument **Arg1.9** in Claim 1 f) above :

The star is not element independent of the original image since it represents a texture, here a "cloud to be drawn laying over the ocean at region 270" (Col. 25, lines 19-31) that is mapped into the 3D world.

Claim 36 should therefore be allowed.

3. Conclusions

Applicant hope that the arguments above allow claims 1, 3, 5, 10, 24, 34, 36 and their dependent claims 4, 7, 13, 25, 26, 27, 28, 35, 37, and 38 to be allowed.

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Next pages: Amended claims